

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.(Original) A beam-shaping optical element having an entrance surface, an exit surface located opposite thereto and an optical axis, wherein the optical axis coincides with the Z-axis of a three-axis rectangular XYZ system of coordinates, and at least one of the entrance surface and the exit surface is represented by a mathematical equation comprising a term representing a non-rotationally symmetric aspherical profile and correction terms, each correction term being a function of either variable X or Y, at least one of the correction terms being a function of variable X and at least one of the correction terms being a function of variable Y.

2.(Currently Amended) A The beam-shaping optical element

according to claim 1, wherein the at least one correction term comprising a function of variable X alone comprises a power of X, multiplied by a correction factor and the at least one correction term comprising a function of variable Y alone comprises a power of Y, multiplied by a correction factor.

3. (Currently Amended) A The beam-shaping optical element according to claim 1, wherein the at least one of the entrance surface and the exit surface is represented by the mathematical equation

$$Z = \frac{c_x x^2 + c_y y^2}{1 + \sqrt{1 - (1 + k_x)(c_x^2 x^2) - (1 + k_y)(c_y^2 y^2)}} + \sum_{i=1}^m A_i x^{2i} + \sum_{i=1}^m B_i y^{2i}$$

in which  $c_x$  and  $c_y$  are the curvature of the surface in the direction of the X axis and Y axis, respectively, and  $k_x$ ,  $k_y$  and the correction factor  $A_i$  and  $B_i$  are constants.

4. (Currently Amended) A The beam-shaping optical element according to claim 3, in which the values of  $c_x$  and  $c_y$  are substantially different.

5. (Currently Amended) A-The beam-shaping optical element according to claim 3, in which  $A_i$  is non-zero for at least one value of  $i$  and  $B_j$  is non-zero for at least one value of  $j$ .

6. (Currently Amended) A-The beam-shaping optical element according to claim 1, in which at least one of the entrance and exit surfaces has a shape for minimizing the wave front aberrations of a light beam from a radiation source having passed through the beam-shaping optical element.

7. (Currently Amended) A-The beam-shaping optical element according to claim 1, wherein an elliptical cross-section of a beam supplied by a radiation source is converted into a substantially circular cross-section.

8. (Currently Amended) A-The beam-shaping optical element according to claim 1, positioned between a semiconductor laser and an optical element for converting a beam from the semiconductor laser into a parallel, diverging or converging light beam.

9. (Currently Amended) A-The beam-shaping optical element according to claim 1, wherein a distance from the emitting point of a semiconductor laser to the entrance surface of the element is smaller than a distance from the image of the emitting point formed by the beam-shaping optical element to the entrance surface and with the image located in the object space.

10. (Currently Amended) A-The beam-shaping optical element according to claim 1, wherein the mathematical equation

$$(NA_{out}/2) (1/NA_{inx} + 1/NA_{iny}) < 1$$

is satisfied, where  $NA_{out}$  is a numerical aperture at the exit surface and  $NA_{inx}$  and  $NA_{iny}$  are numerical apertures at the entrance surface in the X-Z plane and Y-Z plane, respectively.

Claims 11-19 (Canceled)

20. (New) The beam-shaping optical element of claim 1, wherein

at least one of the correction terms is adjusted to a merit function to approach the desired value.

21. (New) The beam-shaping optical element of claim 20, wherein the merit function is for a wave front aberration.

22. (New) The beam-shaping optical element of claim 20, wherein a value of the merit function is based on a first vergence of a first beam at the entrance surface and a second vergence of a second beam at the exit surface.